ICRAMCS 2026

THE EIGHTH EDITION OF THE INTERNATIONAL CONFERENCE ON RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE
April 23-24-25, 2026 | Marrakech, Morocco

On the affine and affine polarized k−symplectic manifolds

Communication Info

Authors:
El mokhtar FANICH[1,2]
Said ESSABAB[1]

[1]Hassan II University of Casablanca, Faculty of Sciences Ben M'Sik
[2]CRMEF Guelmim Oued Noun

Keywords:
1. polarized k-symplectic structure
2. affine manifold
3. affine transformations
4. symplectic geometry
5. Hamiltonian mechanics

Abstract

Physical and mathematical considerations led to the introduction of the notion of polarized k-symplectic structure [1, 2, 3], indeed, polarized k-symplectic geometry is a generalization of polarized symplectic geometry formalizing the mechanics of Numbu like symplectic geometry which formalizes Hamiltonian mechanics.

An affine manifold is a manifold provided with an atlas whose map changes are affine transformations. Map changes of an affine manifold of dimension m are affine transformations $x \to Ax + B$ of R m. When we impose on the matrix A to belong to a subgroup of GL(m, R), we obtain a particular class of affine manifolds. One can cite for example the flat Riemannian manifolds: A is orthogonal. Thus from the point of view of related manifolds, this work can be considered as an enrichment of the classes of manifolds studied. We will see that the study of affine polarized k-symplectic manifolds leads naturally to the study of affine transformations $x \to Ax + B$ with A being an element of the polarized k−symplectic group Sp(k, n; R).

References

[1] AWANE A., Sur une généralisation des structures symplectiques. Thèse, Strasbourg (1984).

[2] AWANE A., k−symplectic structures. Journal of Mathematical Physics 33 (1992) 4046 - 4052.

[3] NAMBU Y., Generalized Hamiltonian Dynamics. Physical Review D Volume 7,Number 8 15 April 1973.

[4] AUBERT A., Structures affines et pseudo-métriques invariantes à gauche sur des groupes de lie. Thèse, Montpellier (1996).

[5] AUSLANDER L., Examples of locally affine spaces Ann. of Maths. 64 (1964) 255-259..